

# A Completely Automatic Sirup Draw-off

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How often sirup makers have said that what we really need is a fool-proof, COMPLETELY (not just partially) automatic sirup draw-off, one that would automatically compensate for changes in the boiling point of water with changes in barometric pressure (changes in weather). Such a draw-off, without any attention, would open a valve on an evaporator or finishing pan and draw sirup at the instant it reached a desired density, i.e., when its boiling temperature has been elevated a certain number of degrees above the boiling point of water. Such an instrument is a far cry from the automatic draw-offs

that we and others have designed and which are on the market today. These so-called automatic draw-offs do perform automatically the job for which they were designed. They will cause the sirup take-off valve to open when the boiling temperature of the sirup reaches some selected temperature at which the instrument has been set. These instruments are not fully automatic since (a) they must be hand set so that the sirup take-off valve will open at some selected temperature; (b) they require measuring the temperature of the boiling point of water at least three times daily with a precision thermometer; (c) they require that the temperature of boiling sirup must be measured accurately with a precision thermometer so that the instrument can be hand set to operate the valve at some fixed and definite temperature above the water-boiling temperature.

These instruments do a good job when the barometric pressure remains steady, as it often does; but, unfortunately, during the sirup making season the weather is often stormy and unsettled and the barometer is anything but steady. Therefore, unless careful attention is given to determining the temperature of boiling water frequently and resetting the automatic draw-off each time to compensate for changes in the barometric pressure, the density of the drawn sirup can vary more than 1° or 2° Brix.

Being quite aware of the need for a fully or completely automated draw-off, we consulted a number of instrument manufacturers but found none wanted to tackle the job of designing or making one. So the matter stood until Mr. Joseph Connelly, the electronic instrument specialist at the Philadelphia Laboratory, heard of our problem. He promptly volunteered that he could design and build one, and just as simply as that, he did.

The first instrument was built, tested in the laboratory under simulated conditions, and then put into the field where it was tested under commercial operating conditions. Of course, a few minor shortcomings were noted and a second instrument, embodying necessary changes, was made. This instrument was also tested under commercial conditions. Because this instrument proved to be A-OK, its commercial manufacture was investigated.

The Connelly automatic maple sirup draw-off consists of four basic electronic parts: a specially designed wheatstone bridge circuit, temperature sensing elements, relay switch, and a magnetically operated (solenoid) draw-off valve. Built into the wheatstone bridge circuit is a meter with a dial that reads directly in tenth degrees F. The zero on this scale is the temperature of boiling water, not zero on the F. scale. The instrument constantly measures and automatically adjusts itself so that zero on the scale is always the temperature of the boiling water. The

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dial is provided with two needles, a black one which indicates the exact temperature of the boiling sirup in the number of degrees F. above the true boiling point of water (zero mark on scale), and the other needle (a red one) which is hand set to a temperature (degrees F. above the boiling point of water) that will give sirup of a desired density.

There are two temperature sensors called thermistors. These are attached through wire leads to two sides of the wheatstone bridge. One of the thermistors serves as the master, and is kept in saturated flowing steam, supplied from either a steam line or a pot of boiling water. It continuously measures the temperature of boiling water and, by automatically correcting the zero point, governs the temperature at which sirup is to be drawn. The other thermistor, the slave, measures the temperature of the boiling sirup. As the temperature of the boiling sirup increases, the black needle moves across the dial until it reaches a point (°F. above the boiling point of water) at which the red needle

is hand set. When this occurs, a relay is operated and electrical current is supplied to flash lights, ring a bell, and/or open the magnetic (solenoid) valve.

Once the evaporator is in operation the solenoid draw-off valve will continue periodically to open and close. This will occur as long as the evaporator is in continuous operation. The density of the drawn sirup will remain constant throughout the entire operation, even though the barometric pressure may have fluctuated up and down during the operation.

While there are a number of magnetically operated valves on the market, we have found the one described in our CA E-32 to be well suited to sirup making and as an integral part of the fully automatic draw-off system. Not only is this valve rugged but, because the seat is a neoprene ring, it flexes each time the valve closes, thereby freeing itself of any adhering sugar sand to minimize the danger that the valve will freeze in either an open or closed position.


The only time the completely automatic draw-off requires attention is the initial setting of the red needle at the start of the evaporation operation. However, if it is desired to change the density of the sirup being drawn from the evaporator or finishing pan, the change is instantly made merely by moving the red needle to a new position.

A technical paper giving full construction and operating details is in preparation by Mr. Connelly, and will be published soon.

The controller wheatstone bridge for the Connelly automatic sirup draw-off can now be obtained from either Electronic Mechanisms, Inc.,\* 1149 Chelton Avenue, Philadelphia, Pennsylvania 19138, or Assembly Products Instrument Company, Chesterland, Ohio 44026. The special thermistors and moistureproof leads can be obtained from Yellow Springs Instrument Company, Yellow Springs, Ohio (their No. CQ97).

\*Mention of company or trade names does not imply endorsement by the Department over others not named.

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# Women's Page

Recipes from here and there.  
Edited by Mary Lou Sipple.

Mrs. A.L. Bodley of Sioux Falls, S. Dakota sent this recipe. She is not a "maple syrup maker", she is one of our many consumers, and this pie is delicious but not too sweet:

## MAPLE CREAM PIE

*Yolks of 3 eggs, beaten slightly  
½ cup maple syrup*

Cook in double boiler 'til thick.

Soak 2 teaspoons gelatine in ¼ cup cold water, then add the syrup and egg yolk mixture. Cool. Beat 1 cup heavy cream, add to the cooled mixture and pour into a baked pie shell. Put chopped pecans over the top and chill several hours.

From "The Art of Maple Cookery", published by the Farmer's Museum at Cooperstown come the next two recipes:

## MAPLE SUGAR PIE

*1 egg  
1 tb. flour  
1 cup maple sugar  
1 cup sweet cream  
1 tb. butter*

Beat all together and bake in one crust 'til knife inserted in center comes out clean.

## MAPLE DROP COOKIES

*½ cup shortening  
1 cup maple syrup  
1 beaten egg  
2¼ cups flour  
2 tsp. baking powder*

*½ tsp. salt  
½ cup chopped pecans*

Combine in order given. Let stand 5-10 min. before baking in a 375 degree oven.

The next recipe from Mrs. Carole Dunn of Mannsville, N.Y. is good on spare ribs or as a beef sauce:

## MAPLE BARBEQUE

*½ cup chopped onion  
2 Tb. vinegar  
2 Tb. Worcestershire sauce  
1 Tb. Salt  
1 Tsp. chili powder  
¼ Tsp. black pepper  
¾ Cup maple syrup  
¾ Cup water*

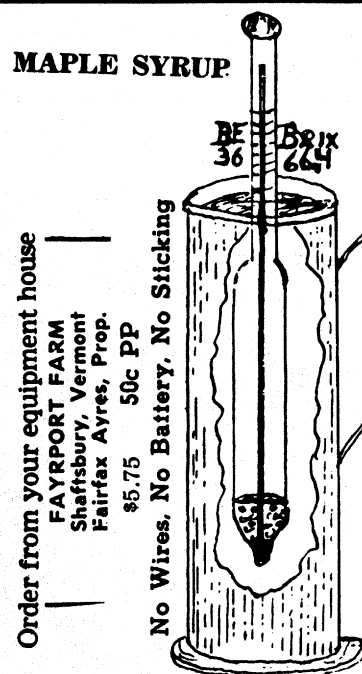
Pour over 5 lbs. spare ribs which have been dredged in flour. Cover;

## Film for State's Schools



A print of the Somerset County Maple Festival film "It's Maple Sugar Time in Somerset County" was presented to Dr. George Hoffman (left) of the State Department of Public Instruction. Mrs. Robert C. Clapper of Meyersdale, President of the Somerset County Maple Festival of Pennsylvania, Inc., and County Agent, James A. Bochy, are shown viewing the educational film with Dr. Hoffman. The film, the third print in circulation, will be placed in the Department of Public Instruction library in Harrisburg and will be catalogued for circulation to all schools in the state. It is also available for public showing through the Commonwealth library.

## MAPLE SYRUP



## THE HYDROTHERM

INDICATES STANDARD WEIGHT MAPLE SYRUP JUST DRAWN OFF OR STANDING NOT TOO COLD IN STOREROOM AT ANY TEMPERATURE BETWEEN 210F AND 55F

If the TIP OF THE RED floats even with surface of syrup it is standard weight - 36 BE - 66.4 Brix.

If TIP rides high syrup is heavy. Draw off light syrup into pail. STIR with cup. Test new sample. Keeping adding light until RED TIP floats even.

If RED TIP can not be seen, syrup is light, boil more.